

CIDARIS COMPTONI, sp. nov.

A Cretaceous Echinid from Gingin.

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Read 12th December, 1922.

Fossils from the Cretaceous Beds at Gingin have been known for many years.¹ In 1903 Mr. E. S. Simpson paid a short visit to the locality, when he obtained an interesting series of fossils which were examined by the late R. Etheridge, junior, Curator of the Australian Museum, Sydney. Mr. Etheridge determined certain Echinid spines (5556-242) as belonging to two species of *Phyllacanthus*, a genus known from the Cainozoic Beds of Willunga, South Australia.

In Bulletin 36 of the Geological Survey of Western Australia (1910) I compared these with the "numerous muricated Cidarid spines plentiful in the White Chalk and other Cretaceous Beds of Europe" and mentioned the presence of numerous hexagonal plates.

Three years later, Bulletin 55 was devoted to Mr. Etheridge's report on an extensive collection of fossils amounting to over 200 specimens. The Echinid spines were grouped under seven types, the general characters of all these spines being "quite in accord with those of the genus *Cidaris*. Some one or other was included in my preliminary list as *Phyllacanthus*."²

A specimen which has recently come into my hands is sufficiently complete to enable me to attempt a description.

The specimen, which was collected by Mr. G. Spencer Compton, consists of an almost complete interambulacral area, to which are attached portions of the adjacent ambulacra. The large coronal plates above the ambitus are somewhat corroded, and those adjoin-

(1) For all references see Glauert, G.S.W.A. Bulletin 36, 1910, pages 118-9.

(2) Etheridge, G.S. W.A. Bulletin 55, 1913, page 12.

ing the apical disc and the peristome are imperfect; in addition, two of the upper plates have been pressed out of their normal position, so that it is impossible to give the exact dimensions of the test. It is estimated that the height of the test was 20 mm. and the diameter at the ambitus approximately 35 mm.

The ambulacral area is narrow, sinuous, almost straight; the plates simple. Tubercles in six rows at the ambitus, the outer the larger, mammillated, the next smaller and plain, the inner very small and not long persisting, the outer alone reaching the apical disc and the peristome. Each of the larger mammillated tubercles is opposite to a pair of pores. Poriferous zone narrow, depressed, each plate bounded by a slender ridge above and below, about fifteen plates in relation to the largest interambulacral coronal plate. Pores oblique circular, unigeminal, approximate, separated from one another by a septum supporting a rudimentary granule.

The interambulacral area is wide, about six times as wide as the ambulacral area at the ambitus; plates in series of five (?); boss small, plain, mamelon high, perforated; areola large, circular, depressed, surrounded by a ring of about sixteen mammillated, oval tubercles, a few smaller, mammillated tubercles placed beyond these fit in between the larger so as to complete the circle; miliary zone narrow, with closely approximated larger and smaller granules interspersed; sutures distinct. The median space is sunken, with a well-marked depression at the junction of the transverse and vertical sutures. Actinally the plates are broader than high, with scrobicular circles in contact above and below; apically the proportions are reversed and the circles are separated by a narrow miliary zone.

It is a matter of considerable difficulty to determine the exact systematic position of the Gingin specimen. I have not been able to find a diagnosis of the genus *Typocidaris*, but it would appear to be a cidarid with narrow ambulacra, round, approximate, non-conjugating pores, separated by a granuliferous septum; homogeneous granulation on the miliary zone of the interambulacral plates, and distinct sutural fossettes. *Cidaris*³ has a small number of interambulacral coronal plates (5-8), with the ambulacra more or less undulating; the round pores of pairs rather close and separated by a nodule or ridge; and the primary tubercles perforated and crenulated. *Dorocidaris* has the ambulacral median area narrow; a small number of interambulacral coronal plates; scrobicles sunken and median space also. Tubercles without crenulation, and the oval pores of a pair without an intermediate groove.

Dorocidaris is a true *Cidaris* with no crenulation on the tubercles.

(3) See Duncan, P. M.: A Revision of the Genera and great groups of the Echinoidea, Journ. Linn. Soc. Zool. XXIII., 1889, pp. 31 and 31.

The Gingin specimen differs from *Typocidaris* in the rudimentary condition of the granule on the septum of the poriferous zone, the irregular size of the granules of the miliary zone, and the absence of distinct sutural fossettes. It may be described as a *Cidaris* with plain tubercles, or as a *Dorocidaris* with round pores. As Wright has shown in his "Monograph on the Cretaceous Echinodermata from the Cretaceous Formation of England" that the crenulation of the primary tubercle is not a constant feature in certain specimens or species, I consider it advisable to regard the echinid from Gingin as a *Cidaris* s.s.

Spines similar to those occurring in the Gingin Chalk are found on *Cidaris*, *Dorocidaris*, and *Typocidaris*; they therefore give no assistance in determination.

The literature available has enabled me to compare the Gingin fossil with a large number of Mesozoic cidarids from Europe, North America, North and South Africa, Sinai, Arabia, and India. The species that show the greatest resemblance are briefly referred to below.

Cidaris hirudo, Sorignet, 1850,⁴ from the White Chalk of England and France, bears a strong superficial resemblance to the Gingin specimen, having round approximate pores and primary tubercles in series of 5 or 6, but the granular zone of the ambulacra is wider and the bosses of the primary tubercles are crenulated, not plain. Spines of a species closely related to, if not identical with, this have been recorded from the Cretaceous Beds of Pondoland, South Africa, and from the Utatur Cretaceous of Southern India.⁵

Cidaris pyrenaica, Cotteau, 1862,⁶ from the Lower Albian of Gebel-el-Rekeib in Sinai, as shown by Fourtau's figure, is very near the Gingin form, but the boss of the primary tubercle is larger, the areola smaller, and the miliary zone more extensive with granules becoming smaller as they recede from the scrobicular circle.⁷ Again, though the true *Cidaris* has the boss crenulated, and though the boss is so described by Fourtau, his figure shows a plain (smooth) boss.

Dorocidaris namadica (Duncan), 1887,⁸ from the Cretaceous Beds (Aptian) of the lower Narbada valley of India, has more numerous primary tubercles, smaller mamelons, and the granules of the miliary zone decrease in size as they recede from the scrobicular circles; its ambulacral area is wider, the poriferous zone broader with oval pores, also twenty-five pairs of pores are opposite

(4) Sorignet "Oursins foss. de l'Eure, 1850: p. 17, and Wright, Mon. Brit. foss. Echin. from Cret. Form I., 1864-82, p. 64, Pl. IX., X., figs. 1-5.

(5) H. Woods. Ann. South Afr. Mus. 4, part 7, 1908, p. 276.

(6) Cotteau, Pal. Frances., Terr. Cret. VII., p. 201, pls. 1047 and 1048, figs. 1-10, 1862.

(7) R. Fourtau, Cat. Inv. Foss. de l'Egypte, Terr. Cret., Part III., 1921, p. 2, Pl. I., figs. 1 and 2.

(8) Duncan, P. M., Rec. Geol. Surv. India, Vol. XX., 1887, p. 87, and plate figs. 1-3.

the largest interambulacral coronal plate. This species, also, has four rows of tubercles on the interporiferous zone at the ambitus, of which two only persist apically and actinally.

Dorocidaris dowsoni, R. Fourtau, 1919 (? 1921),⁹ from the lower Albian of the Gebel Mandhour, Northern Sinai, is very closely related to the Gingin species, but the pores are oval, the granules on the septa more developed; there are but four rows of tubercles at the ambitus; the primary tubercles are in series of 5 or 6, the mamelon smaller, the areola less sunken, the median zone is narrow and but slightly depressed at the junction of the transverse and vertical sutures.

Dorocidaris jullieni (Gauthier), 1976¹⁰ from Algeria, and occurring also in the Aptian of Gebel Mandhour and Gebel Oum Ragaoui in Sinai, of which I have not been able to see a figure or full description, has its primary tubercles in series of 6-7, with round scrobicular circles, rather deep, and all in contact above and below; the miliary zone is very narrow, and only visible on specimens of large size. The ambulacra have four rows of tubercles at the ambitus (six in large specimens), together with numerous minute, irregularly placed subsidiary granules, which latter are absent in the Gingin echinid. The pores are oval in a narrow, depressed poriferous zone.

Typocidaris malum (Albin Gras), 1848,¹¹ found in France and in the Albian and Aptian of Gebel Mandhour and Gebel G'tat el Zeit in Sinai, which has six rows of tubercles in a series at the ambitus and distinct sutural fossettes on the interambulacral areas, has the plates for the primary tubercles with more extensive miliary zones, which are covered with a homogeneous granulation.

Typocidaris proxima, R. Fourtau, 1920 (? 1921),¹² from the Aptian of Oum G'far, Rissan Aneiza massif in Sinai, has from 6 to 7 primary tubercles in a series, distinct sutural fossettes, and four rows of ambulacral tubercles at the ambitus. The figures show that this form has circular non-conjugating pores separated by a granuliferous septum, but the poriferous zone is wider, and there are but four rows of tubercles at the ambitus. The larger coronal plates have a much more extensive miliary zone with homogeneous granulation on all plates, including those which have the scrobicular circles in contact above and below; this feature is very distinct in Fig. 7a, but is not indicated in Fig. 7, where an imperfect test is figured.

(9) R. Fourtau, Cat. Inv. Foss. de l'Egypte, Terr. Crét., Part III., 1921, p. 4, Pl. I., figs. 3-4.

(10) Gauthier in Cotteau, Peron et Gauthier Echin. foss. de l'Algerie, fasc. III., 1876, p. 32, Pl. III., figs. 1-9.

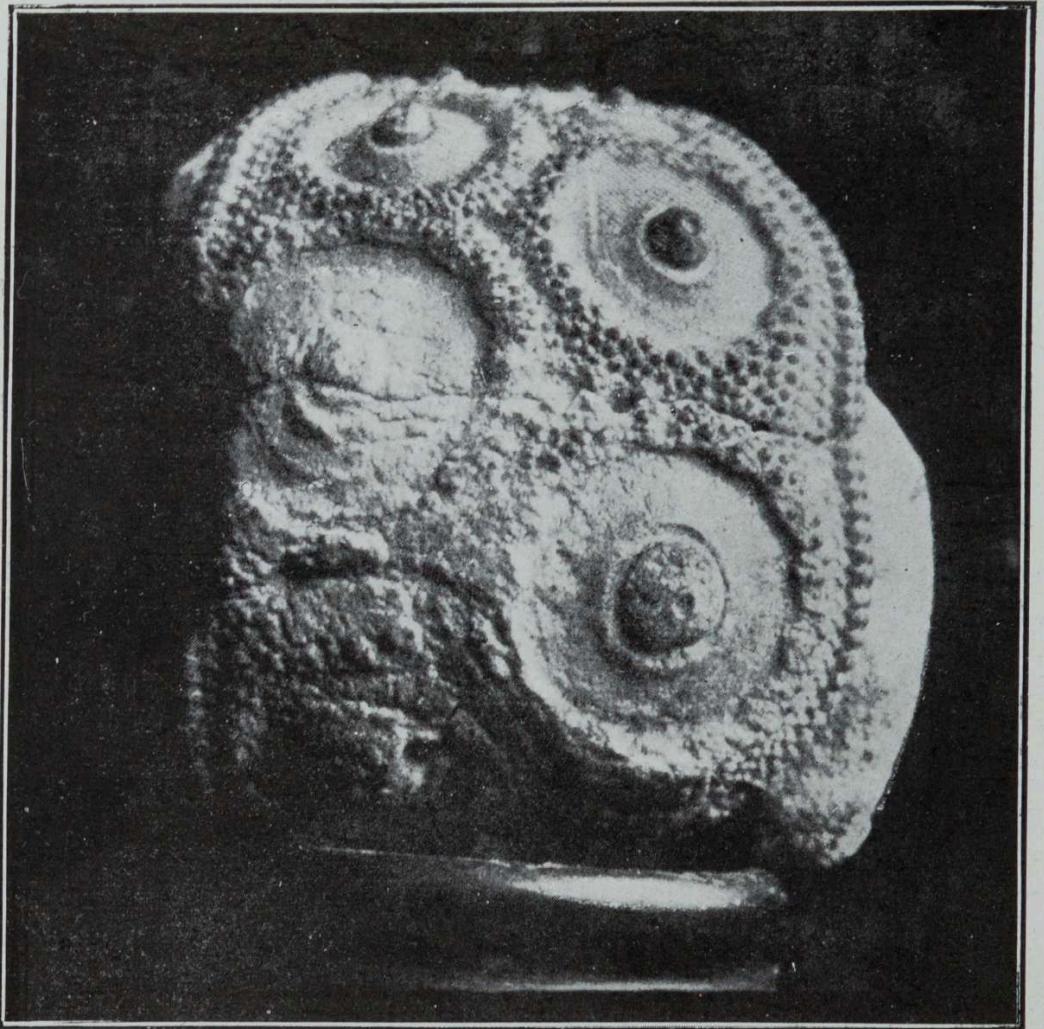
(11) Albin Gras, Oursins foss. de l'Isere, 1848, p. 22, Pl. I., figs. 1-3.

(12) R. Fourtau, Catal. Inv. Foss. de l'Egypte, Terr. Cret., Part III., 1921, p. 6, Pl. III., figs. 7-9.

The specimen from the Gingin Chalk, which is the first Echinid of Cretaceous age to be found in Australia, was collected by Mr. G. Spencer Compton, whose painstaking researches have increased our knowledge of the fauna of that limited and rapidly disappearing deposit. As a compliment to the discoverer I have named the species *Cidaris comptoni*.

The type, G 3775, is in the collection of the Western Australian Museum, Perth.

Plate III.



G. Pitt Morison, photo.

Cidaris comptoni sp. nov.